That Which Is Claimed Is:

1. A helper cell for expressing an infectious, replication defective, alphavirus particle, comprising, in an alphavirus-permissive cell:

(a) a first helper RNA encoding *(i)* at least one alphavirus structural protein, and *(ii)* not encoding at least one other alphavirus structural protein; and

(b) a second helper RNA separate from said first helper RNA, said second helper RNA *(i)* not encoding said at least one alphavirus structural protein encoded by said first helper RNA, and *(ii)* encoding said at least one alphavirus structural protein not encoded by said first helper RNA, and with all of said alphavirus structural proteins assembling together into alphavirus particles in said cell containing said replicon RNA;

and wherein said alphavirus packaging segment is deleted from at least said first helper RNA.

2. The helper cell according to claim 1, further containing a replicon RNA;

said replicon RNA encoding said alphavirus packaging segment and an inserted heterologous RNA;

wherein said alphavirus packaging segment is deleted from at least one of said helper RNA;

and wherein said replicon RNA, said first helper RNA, and said second helper RNA are all separate molecules from one another.

3. The helper cell according to claim 1, further containing a replicon RNA;

said replicon RNA encoding said alphavirus packaging segment and an inserted heterologous RNA;

wherein said replicon RNA and said first helper RNA are separate molecules;

and wherein the molecule containing said replicon RNA further contains RNA encoding said at least one alphavirus structural protein not encoded by said first helper RNA.

4. The helper cell according to claim 1, wherein said first helper RNA encodes both said alphavirus E1 glycoprotein and said alphavirus E2 glycoprotein, and wherein said second helper RNA encodes said alphavirus capsid protein.

5. The helper cell according to Claim 1, wherein said alphavirus is selected from the group consisting of Eastern Equine Encephalitis virus, Venezuelan Equine Encephalitis virus, Everglades virus, Mucambo virus, Pixuna virus, Western Equine Encephalitis virus, Sindbis virus, Semliki Forest virus, Middelburg virus, Chikungunya virus, O'nyong-nyong virus, Ross River virus, Barmah Forest virus, Getah virus, Sagiyama virus, Bebaru virus, Mayaro virus, Una virus, Aura virus, Whataroa virus, Babanki virus, Kyzylagach virus, Highlands J virus, Fort Morgan virus, Ndumu virus, and Buggy Creek virus.

6. The helper cell according to Claim 1, wherein said alphavirus comprises Venezuelan Equine Encephalitis virus.

7. The helper cell according to Claim 1, wherein said alphavirus comprises Sindbis virus.

8. The helper cell according to Claim 1, wherein said alphavirus comprises Semliki Forest virus.

9. The helper cell according to Claim 1, wherein at least one of said first helper RNA and said second helper RNA includes at least one attenuating mutation in said RNA.

10. The helper cell according to Claim 6, wherein at least one of said first helper RNA and said second helper RNA includes at least one attenuating mutation selected from the group consisting of codons at E2 amino acid position 76 which specify an attenuating amino acid, codons at E2 amino acid position 120 which specify an attenuating amino acid, codons at E2 amino acid

position 209 which specify an attenuating amino acid, codons at E1 amino acid 272 which specify an attenuating mutation, codons at E1 amino acid 81 which specify an attenuating mutation, codons at E1 amino acid 253 which specify an attenuating mutation, and the deletion of E3 amino acids 56-59.

11. The helper cell according to Claim 7, wherein said Sindbis virus comprises the S.A.AR86 strain of Sindbis virus and wherein said RNA encoding said structural proteins of S.A.AR86 virus comprise at least one attenuating mutation selected from the group consisting of codons at nsP1 amino acid position 538 which specify an attenuating amino acid, codons at E2 amino acid position 304 which specify an attenuating amino acid, codons at E2 amino acid position 314 which specify an attenuating amino acid, codons at E2 amino acid position 372 which specify an attenuating amino acid, codons at E2 amino acid position 376 which specify an attenuating amino acid, codons at nsP2 amino acid position 96 which specify an attenuating amino acid, codons at nsP2 amino acid position 372 which specify an attenuating amino acid, codons at nsP2 amino acid position 529 which specify an attenuating amino acid, codons at nsP2 amino acid position 571 which specify an attenuating amino acid, codons at nsP2 amino acid position 682 which specify an attenuating amino acid, codons at nsP2 amino acid position 804 which specify an attenuating amino acid, and codons at nsP3 amino acid position 22 which specify an attenuating amino acid.

12. The helper cell according to Claim 1, wherein said first helper RNA and said second helper RNA both include a promoter.

13. The helper cell according to Claim 2, wherein said replicon RNA includes a promoter.

14. The helper cell according to Claim 12 or 13, wherein said promoter is a Venezuelan Equine Encephalitis virus 26S subgenomic promoter.

15. The helper cell according to Claim 1, wherein said inserted heterologous RNA is selected from the group consisting of RNA encoding proteins and RNA encoding peptides.

16. A helper cell for expressing an infectious, replication defective, alphavirus particle, comprising, in an alphavirus-permissive cell:

(a) a replicon RNA encoding an alphavirus packaging sequence and an inserted heterologous RNA;

(b) a first helper RNA encoding the alphavirus E1 glycoprotein and the alphavirus E2 glycoprotein; and

(c) a second helper RNA encoding the alphavirus capsid protein;

so that said alphavirus E1 glycoprotein, said alphavirus E2 glycoprotein and capsid protein assemble together into alphavirus particles containing said replicon RNA therein, in said cell.

17. A helper cell for expressing an infectious, replication defective, alphavirus particle, comprising, in an alphavirus-permissive cell:

(a) a replicon RNA encoding an alphavirus packaging segment, an inserted heterologous RNA, and an alphavirus capsid protein; and

(b) a first helper RNA encoding the alphavirus E1 glycoprotein and the alphavirus E2 glycoprotein;

so that said alphavirus E1 glycoprotein, said alphavirus E2 glycoprotein and capsid protein assemble together into alphavirus particles containing said replicon RNA, in said cell.

18. A method of making infectious, replication defective, alphavirus particles, comprising:

transfecting an alphavirus-permissive cell according to claim 1 with a replication defective replicon RNA, said replicon RNA including said alphavirus packaging segment and an inserted heterologous RNA;

producing said alphavirus particles in said transfected cell; and then collecting said alphavirus particles from said cell.

19. The method according to Claim 18, wherein said transfecting step is carried out by electroporation.

20. A set of RNAs for expressing an infectious, replication defective alphavirus, said set comprising, in combination:

(a) a replicon RNA encoding a promoter, an inserted heterologous RNA, and wherein RNA encoding at least one alphavirus structural protein is deleted therefrom; and

(b) a first helper RNA separate from said replicon RNA, said first helper RNA encoding *in trans* said structural protein deleted from said replicon RNA and a promoter.

21. The set of RNAs according to Claim 20, further comprising a second helper RNA separate from said replicon RNA and said first helper RNA, said second helper RNA encoding *in trans* at least one structural protein, which is different from said structural protein encoded by said replicon RNA and by said first helper RNA.

22. The set of RNAs according to Claim 20, wherein said replicon RNA includes RNA encoding the alphavirus capsid protein and both the alphavirus E1 glycoprotein and alphavirus E2 glycoprotein are deleted from said replicon RNA, and wherein said first helper RNA includes RNA encoding both said alphavirus E1 glycoprotein and said alphavirus E2 glycoprotein.

23. The set of RNAs according to Claim 21, wherein said first helper RNA comprises RNA encoding a promoter and an RNA encoding both the alphavirus E1 glycoprotein and the alphavirus E2 glycoprotein, said set of RNAs further comprising a second helper RNA separate from said replicon RNA and said first helper RNA, said second helper RNA encoding the alphavirus capsid protein, *in trans* from both said replicon RNA and said first helper RNA.

24. The set of RNAs according to Claim 20, wherein said replicon RNA includes a packaging sequence; and wherein said first helper RNA packaging sequence is deleted.

25. The set of RNAs according to Claim 20, wherein said alphavirus is selected from the group consisting of Eastern Equine Encephalitis virus, Venezuelan Equine Encephalitis virus, Everglades virus, Mucambo virus, Pixuna virus, Western Equine Encephalitis virus, Sindbis virus, Semliki Forest virus, Middelburg virus, Chikungunya virus, O'nyong-nyong virus, Ross River virus, Barmah Forest virus, Getah virus, Sagiyama virus, Bebaru virus, Mayaro virus, Una virus, Aura virus, Whataroa virus, Babanki virus, Kyzylagach virus, Highlands J virus, Fort Morgan virus, Ndumu virus, and Buggy Creek virus.

26. The set of RNAs according to Claim 20, wherein said alphavirus comprises Venezuelan Equine Encephalitis virus.

27. The set of RNAs according to Claim 20, wherein said alphavirus comprises Sindbis virus.

28. The set of RNAs according to Claim 20, wherein said alphavirus comprises Semliki Forest virus.

29. The set of RNAs according to Claim 20, wherein said first helper RNA and said second helper RNA encoding said alphavirus structural proteins contain at least one attenuating mutation.

30. The set of RNAs according to Claim 20, wherein said first helper RNA and said second helper RNA encoding said alphavirus structural proteins contain at least two attenuating mutations.

31. The set of RNAs according to Claim 26, wherein said RNA encoding said structural proteins of Venezuelan Equine Encephalitis virus comprise at least one attenuating mutation selected from the group consisting of codons at E2 amino acid position 76 which specify an attenuating amino acid, codons at E2 amino acid position 120 which specify an attenuating amino acid, codons at E2 amino acid position 209 which specify an attenuating amino acid, codons at E1 amino acid 272 which specify an attenuating mutation, codons at E1 amino acid 81 which specify an attenuating mutation, codons at E1 amino acid 253 which specify an attenuating mutation, and the deletion of E3 amino acids 56-59.

32. The set of RNAs according to Claim 27, wherein said Sindbis virus comprises the S.A.AR86 strain of Sindbis virus and said RNA encoding said structural proteins of S.A.AR86 virus comprise at least one attenuating mutation selected from the group consisting of codons at nsP1 amino acid position 538 which specify an attenuating amino acid, codons at E2 amino acid position 304 which specify an attenuating amino acid, codons at E2 amino acid position 314 which specify an attenuating amino acid, codons at E2 amino acid position 372 which specify an attenuating amino acid, codons at E2 amino acid position 376 which specify an attenuating amino acid, codons at nsP2 amino acid position 96 which specify an attenuating amino acid, codons at nsP2 amino acid position 372 which specify an attenuating amino acid, codons at nsP2 amino acid position 529 which specify an attenuating amino acid, codons at nsP2 amino acid position 571 which specify an attenuating amino acid, codons at nsP2 amino acid position 682 which specify an attenuating amino acid, codons at nsP2 amino acid position 804 which specify an attenuating amino acid, and codons at nsP3 amino acid position 22 which specify an attenuating amino acid.

33. The set of RNAs according to Claim 26, wherein said promoter is a Venezuelan Equine Encephalitis virus 26S subgenomic promoter.

34. The set of RNAs according to Claim 20, wherein said inserted heterologous RNA is selected from the group consisting of RNA encoding proteins and RNA encoding peptides.

35. Infectious Venezuelan Equine Encephalitis virus particles containing a replicon RNA encoding a promoter, an inserted heterologous RNA, and wherein RNA encoding at least one alphavirus structural protein is deleted therefrom so that said virus particle is replication defective.

36. Infectious alphavirus particles produced by the method of Claim 18.

37. A pharmaceutical formulation comprising infectious alphavirus particles according to Claim 35 or 36 in an effective immunogenic amount in a pharmaceutically acceptable carrier.